

Listing of Claims

This listing of claims replaces all prior versions, and listings, of claims in the application:

Claims 1.-20. (Canceled)

21. (Currently Amended) A method comprising:
electroplating tin from a solution comprising
a bath-soluble tin compound,
a methane-sulfonic acid, and
a polyethyleneglycol alkyl-3-sulfopropyl diether,
wherein the tin is electroplated with a current density of greater than approximately 30 mA/cm² and a plating efficiency of greater than approximately 95%.

22. (Currently Amended) The method of claim 21, wherein electroplating the tin further comprises electroplating the tin with the current density being greater than approximately 40 mA/cm².

23. (Currently Amended) The method of claim 22, wherein electroplating the tin further comprises electroplating the tin with the current density being greater than approximately 50 mA/cm².

24. (Canceled)

25. (Currently Amended) The method of claim ~~[[24]]~~ 21, wherein electroplating the tin further comprises electroplating the tin from the solution, wherein: including
the bath-soluble tin compound comprises one or more
stannous alkane sulfonates of ~~[[the]]~~ a formula $(\text{RSO}_3)_2\text{Sn}$, where
R is an alkyl group that includes from one to twelve carbon
atoms

~~one or more of a sulfuric acid, an alkane sulfonic acid,~~
~~and an alkanol sulfonic acid, and a mixture thereof, and~~
~~the sulfopropylated anionic surfactant having a polymeric~~
~~hydrophilic portion.~~

26. (Currently Amended) The method of claim 25, wherein electroplating the tin further comprises electroplating the tin from the solution, wherein: including

the one or more stannous alkane sulfonates comprises
between approximately 20 and 40 grams per liter of one of
stannous methane sulfonate, stannous sulfate, and a mixture
thereof~~[[,]]~~ ;

the methanesulfonic acid comprises between approximately
100 and 200 grams per liter of ~~one of~~ methanesulfonic acid,
~~sulfuric acid, and a mixture thereof,~~ ; and

the polyethyleneglycol alkyl-3-sulfopropyl diether
comprises between approximately 1 and 2 grams of one or more
polyethyleneglycol alkyl-3-sulfopropyl diethers per liter.

27. (Previously Presented) The method of claim 21, wherein electroplating the tin comprises electroplating tin onto a semiconductor device.

28. (Previously Presented) The method of claim 27, wherein electroplating tin onto the semiconductor device comprises electroplating tin bumps to connect a semiconductor die to packaging.

29. (Previously Presented) The method of claim 21, wherein electroplating the tin comprises forming a tin deposit that is greater than 99% tin.

30. (Withdrawn) A method comprising:
electroplating tin from a bath including
between approximately 20 and 40 grams per liter of one of stannous methane sulfonate, stannous sulfate, and a mixture thereof,

between approximately 100 and 200 grams per liter of one of methanesulfonic acid, sulfuric acid, and a mixture thereof, and

between approximately 1 and 2 grams per liter of one or more polyethyleneglycol alkyl-3-sulfopropyl diethers.

31. (Withdrawn) The method of claim 30, wherein electroplating tin from the bath comprises electroplating tin from the bath including between approximately 10 and 30 ppm benzalacetone.

32. (Withdrawn) The method of claim 30, wherein electroplating tin from the bath comprises electroplating tin from the bath including between approximately 130 and 170 grams per liter of one of methanesulfonic acid, sulfuric acid, and the mixture thereof.

Claims 33-34. (Canceled)

35. (New) The method of claim 21, wherein the solution further comprises between approximately 10 and 30 ppm benzalacetone.